Claims:

1. Process for the manufacture of alkanes, characterized in that it comprises, as main stage, a reaction resulting from bringing methane into contact with at least one other starting alkane (A) in the presence of a catalyst based on a metal M capable of catalysing a metathesis of alkanes, which reaction results in the formation of at least one or two final alkanes (B) having a number of carbon atoms less than or equal to that of the starting alkane (A) and at least equal to 2.

2. Process according to Claim 1, characterized in that the starting alkane (A) is chosen from substituted or unsubstituted acyclic alkanes and substituted cyclic alkanes.

3. Process according to Claim 1 or 2, characterized in that the starting alkane (A) corresponds to the general formula

$$C_nH_{2n+2}$$

in which n is an integer ranging from 2 to 60.

4. Process according to Claim 1 or 2, characterized in that the starting alkane (A) is a cycloalkane which is substituted and which corresponds to the general formula

$$C_nH_{2n}$$

in which n is an integer ranging from 5 to 60.

5. Process according to any one of Claims 1 to 3, characterized in that the starting alkane (A) is chosen from propane, n-butane, isobutane, n-pentane, isopentane, n-hexane, n-octane, n-nonane and n-decane.

6. Process according to any one of Claims 1 to 3, characterized in that the starting alkane (A) is chosen from C_3 to C_{17} alkanes.

7. Process according to any one of Claims 1 to 3, characterized in that the starting

alkane (A) is chosen from C_{18} to C_{60} paraffins.

8. Process according to any one of Claims 1 to 7, characterized in that the catalyst comprises a hydride of a metal M grafted to and dispersed over a solid support.

9. Process according to Claim 8, characterized in that the metal M is chosen from transition metals, lanthanides and actinides.

10. Process according to Claim 9, characterized in that the metal M is chosen from titanium, zirconium, hafnium, vanadium, niobium, tantalum, chromium, molybdenum and tungsten.

11. Process according to any one of Claims 8 to 10, characterized in that the metal M is at an oxidation state lower than its maximum value.

12. Process according to any one of Claims 8 to 11, characterized in that the solid support is chosen from metal oxides or refractory oxides.

13. Process according to Claim 12, characterized in that the metal M is bonded to one or, preferably, to at least two oxygen atoms of the solid support.

14. Process according to any one of Claims 8 to 13, characterized in that the catalyst is prepared in two stages:

(a) by dispersing over and grafting to the solid support an organometallic precursor (P) comprising the metal M bonded to at least one hydrocarbon-comprising ligand, then

(b) by treating the solid product resulting from the preceding stage with hydrogen or a reducing agent capable of forming a metal M-hydrogen bond.

15. Process according to any one of Claims 1 to 14, characterized in that the reaction resulting from bringing methane into contact with at least the other starting alkane (A) is carried out at a temperature of -30 to +400°C under an absolute pressure of 10^{-3} to 30 MPa.

16. Process according to any one of Claims 1 to 15, characterized in that the reaction resulting from bringing methane into contact with at least the other starting alkane (A) is carried out in the gas phase in a mechanically stirred and/or fluidized bed reactor or in a stationary or circulating bed reactor, the bed being composed essentially of the catalyst.

17. Process according to any one of Claims 1 to 15, characterized in that the reaction

resulting from bringing methane into contact with at least the other starting alkane (A) is carried out in the liquid phase, the catalyst being suspended in the liquid phase.

18. Process according to any one of Claims 1 to 17, characterized in that the methane and the starting alkane(s) (A) are used in a (methane:starting alkane(s) (A)) molar ratio ranging from 0.1:1 to 500:1.

19. Process according to any one of Claims 1 to 18, characterized in that the catalyst is present in the reaction mixture composed of methane and at least the other starting alkane (A) in a proportion such that the molar ratio of methane to the metal M of the catalyst is from 10:1 to 10^5:1.

20. Use of a catalyst capable of catalysing a metathesis of alkanes in a reaction resulting from bringing methane into contact with at least one other starting alkane (A) under conditions resulting in the formation of at least one or two final alkanes (B) having a number of carbon atoms less than or equal to that of the starting alkane (A) and at least equal to 2.